Iowa State University
Agricultural & Biosystems Engineering Department

Graduate Student Handbook: Policies, Procedures, and Recommendations

Version 12.0

Revised February 2015

Agricultural and Biosystems Engineering
Iowa State University
1340 Sukup Hall
Ames, IA 50011
Telephone: 515-294-1434
http://www.abe.iastate.edu/

This Handbook is applicable to all graduate degree programs offered by the Agricultural and Biosystems Engineering Department, as follows:

- **Agricultural and Biosystems Engineering – ME, MS, PhD**
- **Industrial and Agricultural Technology – MS, PhD**

Contacts

Students are referred to the ISU website (http://www.iastate.edu) for the most up-to-date listings of phone numbers and e-mail addresses.

Iowa State University

Ames, Iowa 50011 Tel. 515-294-4111 Office Hours: 8:00 a.m. – 5:00 p.m. Monday – Friday Information 515-294-4111

Graduate Admissions

Office of Admissions - Alumni Hall Iowa State University Ames, IA 50011-2011
grad_admissions@iastate.edu Tel. 515-294-5836 (Toll Free) 800-262-3810 Fax 515-294-2592

Office of the Registrar

214 Alumni Hall Ames, IA 50011-2011
registrar@iastate.edu Tel. 515-294-1840 Fax 515-294-1088

Office of Student Financial Aid

0210 Beardshear hall Ames, IA 50011-2028
financialaid@iastate.edu Tel. 515-294-2223 (Toll Free) 800-478-2998 Fax 515-294-0851

Housing

Department of Residence 2419 Friley Hall Ames, IA 50012
housing@iastate.edu Tel. 515-294-2900 (Toll Free) 800-854-9050 Fax 515-294-0623

Kris Bell

ABE Graduate Secretary, 1350F Elings Hall, Ames, IA 50011
kabell@iastate.edu Tel. 515-294-1033

Student Disability Services

Dean of Students Office 1076 Student Services Building Ames, IA 50011-2222
disabilityresources@iastate.edu Tel. 515-294-7220 TTY: 515-294-6635 Fax 515-294-2397

ISU Graduate College

1137 Pearson Hall Iowa State University Ames, IA 50011-2206 Tel. 515-294-4531
Fax 515-294-3003

ISU Continuing and Distance Education

102 Scheman Iowa State University Ames, IA 50011-1112 Tel. 515-294-6222 Fax 515-294-6223

International Students & Scholars

3248 Memorial Union Ames, IA 50011-1130
intlserv@iastate.edu Tel. 515-294-1120 Fax 515-294-8263

Veteran's Benefits

Veterans Clerks – Office of Registrar 214 Alumni Hall Ames, IA 50011-2011
registrar@iastate.edu Tel. 515-294-1840 Fax 515-294-1088

Steven A. Freeman

ABE DOGE, 3333 Elings Hall, Ames, IA 50011
sfreeman@iastate.edu Tel. 515-294-9541

Table of Contents

Introduction

Training graduate students is one of the most critical missions of the Agricultural & Biosystems Engineering (ABE) Department. Graduate studies in the department are characterized by challenging coursework, independent research, the development of strong writing skills, and excellence at understanding and applying the scientific method. Successful completion of a graduate degree program also requires that students comply with a variety of formal requirements set forth by Iowa State University, the *Graduate College*, and the department. The purpose of this handbook is to provide current and prospective students with information specific to all graduate degree programs offered by the Department.

Graduate Student Responsibilities

Each graduate student must assume full responsibility for knowledge of rules and regulations of the *Graduate College* and of departmental requirements for their chosen degree program. All Agricultural & Biosystems Engineering Department graduate programs have requirements beyond the minimum established by The *Graduate College*.

The *Graduate College* maintains a website (http://www.grad-college.iastate.edu/) with pertinent information, including electronic copies of the *Graduate Catalog*, *Graduate College Handbook* and *Teaching Assistant Handbook*, a link to the Thesis / Dissertation Website (provides guidelines and tips preparation), and an up-to-date listing of deadlines, policies and procedures, and degree requirements. The *Graduate College* website displays the latest *Graduate College* information, some of which may supersede this handbook. Students are urged to keep abreast of current rules and regulations by visiting the *Graduate College* website at least once a semester.

All students should review the "*Graduate College* Handbook" available on line (http://www.gradcollege.iastate.edu/) through the *Graduate College* publications links. This handbook explains in detail the procedures for pre-classification, registration, development of the POS, English requirement, and other pertinent details. ***IT IS THE STUDENT'S RESPONSIBILITY TO SEE THAT ALL DEADLINES AND REQUIREMENTS ARE MET.***

Information on graduate students' rights and responsibilities is provided in Chapter 9 of the *Graduate College* Handbook. All graduate students should familiarize themselves with this information.

Degrees Offered

Masters of Engineering in Agricultural and Biosystems Engineering (ME ABE) – non-thesis
Masters of Science in Agricultural and Biosystems Engineering (MS ABE) - thesis
Master of Science in Industrial and Agricultural Technology (MS IATec) – thesis and non-thesis
Doctor of Philosophy in Agricultural and Biosystems Engineering (PhD ABE)
Doctor of Philosophy is Industrial and Agricultural Technology (PhD IATec)

Admission Requirements

Baseline Academic Requirements

Admission to the Agricultural and Biosystems Engineering departmental graduate degree program is contingent upon the following requirements, which will differ between degree programs:

All Degree Programs

1. 3.0 (4.0 scale) Undergraduate grade-point average (GPA) – Official documentation from previous studies that meets the requirements of the *Graduate College*. Students with a GPA below 3.0 may be admitted on a restricted status.
2. Official documentation of Graduate Record Exam (GRE) scores

3. International (non-English speaking) students need to take the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS).

   Minimum scores for admission are:
   TOEFL Paper (PBT) – 550
   TOEFL Internet (iBT) – 79
   IELTS – 6.5

Agricultural and Biosystems Engineering M.S. and Ph.D. Degrees

- Bachelors of Science degree in engineering
- OR Bachelors of Science degree, non-engineering with:
  - 11 semester credits in math (through differential equations)
  - 16 semester credits in basic sciences

Students who have completed a non-engineering B.S. degree and have a history of strong academic performance can be considered for admission into to the Agricultural Engineering Graduate Program on a provisional status. The ABE Graduate Admissions committee will consider the students potential to be successful within the applicant's proposed study area within the Agricultural and Biosystems Engineering graduate program when considering the admissions of applicants who do not hold a B.S. in engineering. The ABE Graduate Programs Committee will consider the applicant's academic history, GRE scores, experience, qualifications and other relevant information when considering admission of non-engineering B.S. students into the graduate program. Applicants without a B.S. in engineering that are accepted into the Agricultural and Biosystems Engineering graduate program will be admitted into the program on a provisional status and allowed to transition to full admissions status after approval from their Program of Study (POS) committee, and approval of the DOGE. The student's POS committee may request that the student complete additional coursework deemed necessary by the committee prior to transition to full admission status. It is important to note that professional engineering (P.E.) registration is a separate process from a graduate degree, and the prerequisite qualifications for registration without an accredited B.S. in engineering vary among state licensing boards. Students, with the advice of their Program of Study (POS) committee, are responsible for ensuring that the POS meets both general departmental requirements and the particular student's career goals.

Agricultural and Biosystems Engineering M.E. Degree

- Bachelors of Science degree in engineering

Industrial and Agricultural Technology Degrees

- Bachelors of Science degree in science, technology, or engineering

The Graduate Programs Committee, which is responsible for making decisions to admit students, will examine the complete application package, including GRE scores and GPA, when evaluating applications.

Admission Status

You will enter your particular area of graduate study in one of three admission categories:

1. Full Admission Status: You may qualify for full admission if you graduated in the upper one-half of your graduating class with a bachelor's degree from either a regionally accredited U.S. institution or a recognized foreign institution where the requirements for the bachelor's degree are similar to those at Iowa State.
2. Provisional Admission Status: If you meet the requirements for full admission but lack an adequate academic background in your chosen field, you may still be admitted provisionally.
3. Restricted Admission Status: You may be admitted to graduate school in this status if you are in the lower half of your graduating class, or if you lack preparation in your proposed field of study.

Housing

The University maintains residential facilities. University housing is either within walking distance of campus or is served by the city bus system, CyRide. Several housing units are on bicycle trails that travel to campus. Furnished and non-furnished university-owned apartments are available for married and single graduate students. Off-campus private housing is also available. Other housing contacts are listed on the Contacts page at the start of this document.

Health and Dental Care

Health Insurance

Graduate assistants receive single student coverage free of charge under the ISU Student and Scholar Health Insurance Plan. Coverage for hospital, accident expenses, surgical care, and maternity care are included. Graduate assistants may enroll their spouse and children for an additional premium. An enrollment form must be completed before the Semester Enrollment Deadline or within the first 30 days of the date of appointment, whichever is later.

The health insurance plan is administered by The Chickering Group and underwritten by ABEtna Life Insurance Company. A copy of plan information is available on-line at *http://www.hrs.iastate.edu/sship/homepage.html*. For further information, contact The Chickering Group at 1-800-466-2381 or the ISU Student Health Insurance Representative in 0570 Beardshear, 515-294-4820. Graduate assistants do not participate in the ISU staff medical plans.

Student Health Insurance Program Thielen Student Health Center

Iowa State University Iowa State University 0570 Beardshear Sheldon Ave and Union Drive Ames, Iowa 50011-2033 Ames, IA 50011-2260 http://www.hrs.iastate.edu/sship/ http://www.health.iastate.edu/ Tel. 515-294-2394 Tel. 515-294-5801 Fax 515-294-8846 Fax 515-294-5457

The mandatory health fee paid by each student each semester is NOT an insurance plan; it is intended only to complement a student's individual insurance coverage.

Prescription Drug Benefit

Graduate Students receive single coverage free of charge in a program that reduces the cost of prescription medication available at the Thielen Student Health Center Pharmacy. Spouse and children can receive the prescription benefit if they are enrolled in the ISU Student and Scholar Health Insurance Plan and the payroll deduction option is chosen for payment of premium. For further information, browse the Web site at *http://www.hrs.iastate.edu/sship/homepage.html* or contact the Thielen Student Health Center Pharmacy at 515-294-7983.

Dental Insurance

A dental insurance policy is available for students and family through Delta Dental Plan of Iowa. Plan information is available on the Web site at *http://www.hrs.iastate.edu/sship/homepage.html*. The enrollment deadlines are the same as for the health insurance plan.

Financial Aid

The ABE Department offers research assistantships with competitive stipends. Please review the ABE website (http://www.abe.iastate.edu/admissions/graduate-financial-aid.html) about contacting faculty with research interests similar to yours. PhD students receive a full tuition scholarship, and master's students receive at least 50% tuition scholarship. Students on academic probation (does not maintain a cumulative 3.00 grade point average) will not normally receive a tuition scholarship, if appointed to an assistantship. Scholarships and fellowships are also available.

Graduate Student Organizations

Graduate students are encouraged to continue their professional development by becoming student members and participating in the activities of relevant professional societies. Several potential organizations are listed alphabetically below; one or more faculty members in the Department belong to each of the organizations listed.

Professional Organizations – Student Branches

ASABE – The American Society of Agricultural and Biosystems Engineering

There is an active student branch of the ASABE at the Department. Annual membership dues are approximately $20. Student memberships receive the national ASABE newsletter and magazine as well as discounts on national meeting registrations. Graduate students regularly present posters and papers pertinent to their work at national meetings organized by ASABE.

ASSE – American Society of Safety Engineers

This organization's purpose is to educate students on current safety issues, to learn more about safety through peer contact, and to network with safety professionals throughout Iowa.

NAIT – National Association of Industrial Technology

The purpose of this student organization shall be to: 1) Encourage the professional and social development of members in the Industrial Education & Technology Department at Iowa State University; 2) Foster leadership by providing opportunities to serve in responsible positions; 3) Provide for the infusion of knowledge from sources beyond college or university settings such as field trips, seminars and guest speakers; and 4) Provide members and students at Iowa State University with opportunities for the exchange of ideas, experience and friendship among peers.

SME – Society of Manufacturing Engineers

As a student chapter, SME at Iowa State University exists to provide information, resources, and opportunities for students to learn about manufacturing and gain the competitive edge they need to build lucrative, satisfying and influential careers in any manufacturing industry. This organization is comprised of a mixture of Industrial Technology Majors, Engineering Majors, and anyone else who is interested. They participate in plant tours, projects, and are active with our senior chapter.

ISU Student Organizations

ABEGO – Agricultural and Biosystems Engineering Graduate Organization

This organization's aims are to obtain better communication among ABE graduate students; to promote communication between faculty and graduate students; to consider issues of graduate concern in Ag and Biosystems Engineering and Industrial and Agricultural Technology; and to enhance the quality of graduate education in Ag and Biosystems Engineering and Industrial and Agricultural Technology.

AST – Ag Systems Technology Club

This organization works to acquaint students, industry and the general public with opportunities in the field of Ag Systems Technology. The organization also works to develop potential leadership and professional attitudes and to create a spirit of fellowship among the members. This club is affiliated with ASABE.

Departmental Guidelines

Credit Load Limitations

Registration in credit courses is limited to a maximum of 15 credits per semester (10 credits for summer session) for graduate students. Maximum limits for graduate students are shown in the following table:

Table 1. Credit Load Limits by Appointment

Appointment Base	Semester	Summer Session*
no appointment	15 credits	10 credits
¼-time or less	15 credits	10 credits
over ¼-time to ½-time	12 credits	6 credits
over ½-time to ¾-time	9 credits	5 credits
over ¾-time to full-time	**	3 credits

** During the summer, students paying full fees can take up to a maximum of 6 additional hours as research (699), creative component (599), or special topics (590) with no additional fee.*
*** During the regular academic year, graduate assistants are not permitted to be on appointment for more than 3/4 time.*

The credit-hour limits for graduate students may be exceeded only in exceptional circumstances with the written recommendation of the major professor and the concurrence of the department chair and the Dean of the Graduate College. More information on registration requirements for those on assistantship see Graduate Students on Assistantship.

Types of Appointment

Each student's program is an individual endeavor and the requirements and needs of the program depend upon the student's appointment and type of support. The terminology used by the University is: A-base: 12 month support; B-base: 9 month support; C-base: (graduate assistant) research 12 month and teaching 9 month; and D-base: (pre-doctoral associate or post-doctoral associate) 12 month. There are different appointments as follows:

1. *Full-time student--own support* This student can register for a maximum of 15 credits per semester (10 credits for the summer session) with no employment responsibility to the Department. The student is responsible to his or her major professor for fulfilling program requirements and for participating in activities designed for his or her professional development.

2. *Full-time student--supported by another university, foundation, or government agency* This student can register for a maximum of 15 credits per semester (10 credits for the summer session). When planning the POS, the student and the major professor are obligated to see that the objectives as set forth in the sponsoring agency's program are met.

3. *Graduate assistant* This student has a C-base, 1/2-time appointment and is obligated to the Department for this time (approximately 20 hours per week). On assistantship, the student is charged for full time in-state tuition.

    a. Under some circumstances, a teaching or research assistant may be appointed for 1/4- or 3/4-time. On 1/4-time, the student is permitted to enroll for 15 credits per semester (10 credits for the summer session); on 3/4-time the student is permitted to enroll for 9 credits per semester (5 credits for the summer session).

    b. Full-time C-base appointments are permitted for 3 months per year (during the summer only).

c. A graduate teaching assistant is a 9-month appointment with teaching duties. There is no assurance of summer employment. The graduate assistant is assigned to a faculty member for teaching duties.

d. A graduate research assistant is a 12-month appointment, with research duties. The graduate assistant is responsible to a faculty member (normally the student's major professor) for research duties and is responsible to his or her major professor for the POS. If support for an assistantship is from a funded research project, the student is encouraged and may be required to select a thesis problem that is within the scope of the project.

Full-Time and Part-Time Students

During the academic year, graduate students not on assistantship must be registered for a minimum of nine credits to be considered full-time students or five credits to be considered halftime students. During the summer term, students need to check with the Office of Student Financial Aid. Graduate students on assistantship (C-base) are considered full-time and must be enrolled in 1.0 or more credits. The assistantship must also be coded on the student's record in the Graduate College.

Selection of a Faculty Advisor (Major Professor)

Students are admitted only if a member of the ABE Department Graduate Faculty agrees to serve as the student's major professor. It is important that the student determine the area in which he or she wishes to specialize as soon as possible. Major professors can be changed, but in order to plan a Program of Study (POS) wisely, the student should reach a decision very soon on a major professor and a main area of interest. As a general rule, the student has the freedom and responsibility of choosing a major professor. The student should realize, however, that there are constraints:

1. The intended major professor should have current or recent research directly related to the student's interest.
2. Addition of the student to the major professor's group would not prejudice the quality of supervision that this or other students would receive.
3. The major professor has the option not to accept a student who would require an inordinate amount of remedial coursework before the student could become a productive member of the research group.

If for any reason the student wishes to change major professors, this should be discussed with the major professor, the Director of Graduate Education and/or the Department Chair. All faculty want to assist the student in developing a program that will be of benefit to the student and the Department.

Role of the Major Professor

The major professor guides the student in choosing a Program of Study (POS) committee (to be done the first semester in residence). Also, the major professor will guide the student in developing a POS which should be completed before the student completes 12 credits. Thirdly, the major professor will supervise the student's research work, thesis/dissertation preparation and professional development. The major professor is the official liaison between the student and administrative personnel.

Program of Study Committee

In addition to the major professor, the student is required to have a Program of Study Committee consisting of approved faculty members. The student's POS committee serves: 1) to guide, inform, and counsel the student; 2) to discuss and approve a POS; 3) to discuss and approve a topic and research project proposal and the resulting thesis or dissertation; 4) to review progress and provide advice during the student's research; and 5) to conduct the requisite oral and written examinations.

To avoid serious problems at later stages in their programs of study, students are strongly encouraged to develop close working relationships with their POS committee members. To foster this, students are strongly encouraged to give regular progress reports (written or verbal) to all committee members. Because of the critical role of the POS committee, students should establish their committees by the end of the first semester of study.

Master's Committee

The master's POS committee consists of at least three members of the graduate faculty. It must include two members, including the major professor, from the major or program. The committee must include member(s) from different fields of emphasis so as to ensure diversity of perspectives. A term member of the graduate faculty may participate in the direction of a student's master's research as a co-major professor if a member of the graduate faculty serves as a co-major professor and jointly accepts responsibility for the direction of a program of study.

Doctoral Committee

The POS committee for a doctoral program consists of at least five members of the graduate faculty. It must include at least three members, including the major professor, from within the student's major or program. The committee must include member(s) from different fields of emphasis so as to ensure diversity of perspectives. A term member of the graduate faculty may participate in the direction of a student's dissertation research as a co-major professor if a member of the graduate faculty serves as a co-major professor and jointly accepts responsibility for direction of the dissertation.

Program of Study

The Program of Study (POS) is a guideline for coursework to be taken during the graduate program. Each Program of Study is unique and should be developed in consultation with the student's POS committee, to achieve the educational objectives of the student, and to comply with the requirements of the *Graduate College* and the department. The Program of Study should also reflect the research interests of a student.

Program of Study Review Policy:

1. The POS committee has primary responsibility for the content of the Programs of Study.
2. The POS committee should meet to discuss and approve a proposed program. This form will detail the courses used to meet Departmental and University requirements and will show explicitly the necessary calculations.
3. The student will be required to complete the appropriate ABE POS map as part of this process to document how their POS meets departmental requirements. The POS maps are available from the ABE website.

(Note: A Program of Study may include provisions for minor requirements. For example, a statistics minor (M.S. or Ph.D.) is available. Consult the Graduate Catalog for detailed requirements of various minors.)

The courses specified on a POS go through three stages of review:

1. The student's POS committee
2. The Director of Graduate Education
3. The *Graduate College*

Students should note that their POS form should be processed in the above sequence and only in that sequence. All the stages of review are obligatory for ABE students. The University requires signatures on the POS form for all steps.

A clear timeline for completion of the degree is as important as the Program of Study. Such a timeline protects the interests of students, faculty members, and the University, by ensuring that resources are directed towards the production of useful scientific and engineering data in a timely manner. The following

tables list milestone events for each degree program covered by this handbook, along with suggested dates (relative to starting date), for full time students. As soon as the major professor is selected, the graduate student should prepare a mutually agreed upon table with milestone dates appropriate to his or her program. Failure to achieve any milestone by the mutually agreed upon deadline dates may initiate a process resulting in the loss of assistantship and/or dismissal from the graduate program. If a graduate student foresees missing a deadline date, immediate consultation with the major professor should occur.

Table 2. Timing and Checklist of Required Actions Graduate Student Program Checklist

1. English requirement	M.S., Ph.D.	1st semester in residence
2. POS Committee	M.S., Ph.D.	During 1st semester
3. Program of Study (POS) submitted to *Graduate College*	M.S., Ph.D.	By end of 2nd semester before completing 12 credits.
4. Request of Preliminary Examination	Ph.D.	When majority of coursework is completed (less than 12 credits remaining) At least two weeks before exam
Note: Arranged by the student and major professor (both written and oral).		
5. Report of Preliminary Examination	Ph.D.	By major professor
6. Diploma Slip	M.S., Ph.D.	By beginning of semester of graduation (check *Graduate College* deadlines)
7. Request for Final Examination	M.S., Ph.D.	At least three weeks before exam At least six months after preliminary exam

Note: Responsibility for convening the Committee rests with the student and the major professor. No notice is sent from the Graduate College Office.

Course Requirements

Most programs exceed these minima in one or more categories. For students on C-Base appointments, registration for research credits must continue until the final oral has been completed. The major professor may require registration for more research credits than the number shown on the POS (e.g. during the semester in which the thesis is being written). Research credits beyond those required on the POS will be taken satisfactory/fail. Undergraduate-level courses are sometimes required of graduate students to make up deficiencies in undergraduate background. Such courses appear on transcripts and are included in the determination of GPA. These courses may not be taken on a pass/not pass basis and will not count toward the minimum requirements listed below.

Agricultural and Biosystems Engineering Degrees

Master of Engineering - Non-thesis

A minimum of 33 graduate credits beyond the BS degree. The minimums are as follows:

1. 33 minimum credits of coursework, satisfying:
    a. 1 graduate course in mathematics or statistics
    b. 3 ABE graduate courses, excluding ABE 590, 598, 601, 694, and 699
    c. 2 of the following[1]: IE 563, IE 570, MGMT 583, SCM 524
    d. 3 credits of coursework in another College of Engineering department, excluding seminars

Master of Science -Thesis

A minimum of 30 graduate credits beyond the BS degree. The minimums are as follows:

1. 6 credits minimum of ABE 699 Research
2. 22 minimum credits of coursework, satisfying:
    a. 1 graduate course in mathematics or statistics
    b. 2 ABE graduate courses, excluding ABE 590, 598, 601, 694, and 699
    c. 3 credits of coursework in another College of Engineering department, excluding seminars
3. 1 credit of ABE 601 Seminar
4. 1 credit ABE 598 Masters Technical Communication

Doctor of Philosophy

The PhD requires 72 credits beyond the BS degree (master's credits can count toward this minimum). The minimums are as follows:

1. 12 credits minimum of ABE 699 Research
2. 42 minimum credits of coursework beyond the BS degree (The credits from your master's program can count toward this requirement.), satisfying:
    a. 3 graduate courses in mathematics or statistics (at least one must be Statistics 401 or higher)
    b. 4 ABE graduate courses, excluding ABE 590, 601, 694, 698, and 699
    c. 9 credits of coursework in another College of Engineering department, excluding seminars
3. 1 credit of ABE 601 Seminar
4. 1 credit of ABE 698 Doctoral Technical Communication
5. A teaching/extension experience approved by the POS committee

[1] Engineering Management Core: IE 563 Engineering Management Theory; IE 570 Systems Engineering and Project Management; MGMT 583 Strategic Management of Innovation; SCM 524 Strategic Process Analysis and Improvement

Industrial and Agricultural Technology Degrees

Master of Science -Thesis

A minimum of 30 graduate credits beyond the BS degree. The minimums are as follows:

1. 6 credits minimum of TSM 699 Research
2. 22 minimum credits of coursework, satisfying:
    a. 1 graduate course in statistics
    b. 3 TSM or ABE graduate courses, excluding TSM/ABE 590, 598, 601, 694, and 699
3. 1 credit of TSM 601 Seminar
4. 1 credit TSM 598 Masters Technical Communication

Master of Science - Non-thesis

A minimum of 33 graduate credits beyond the BS degree. The minimums are as follows:

1. 3 credits minimum of TSM 599 Creative Component
2. 28 minimum credits of coursework, satisfying:
    a. 1 graduate course in statistics
    b. 4 TSM or ABE graduate courses, excluding TSM/ABE 590, 598, 601, 694, and 699
3. 1 credit of TSM 601 Seminar

Doctor of Philosophy

The PhD requires 72 credits beyond the BS degree (master's credits can count toward this minimum). The minimums are as follows:

1. 12 credits minimum of TSM 699 Research
2. 48 minimum credits of coursework beyond the BS degree (The credits from your master's program can count toward this requirement.), satisfying:
    a. 3 graduate courses in statistics and research methods
    b. 4 TSM or ABE graduate courses, excluding TSM/ABE 590, 601, 694, 698, and 699 (a minimum of 2 TSM courses at the 600 level)
    c. 1-3 credits of TSM 694 Teaching Practicum
    d. 3 courses outside the department
3. 1 credit of TSM 601
4. 1 credit of TSM 698 Doctor Technical Communication

Minimum Requirements for Minors of Interdepartmental Programs

Agricultural and Biosystems Engineering minor for a Ph.D. program shall include:

1. A minimum of 12 credits from engineering departments, exclusive of the student's major department, with a minimum of 6 of those from the Agricultural and Biosystems Engineering Department (including at least one 500- or 600-level course, but excluding ABE 590).
2. Satisfactory completion of a one-day, open-book written preliminary examination administered by the minor representative on the POS committee.

Additional Requirements and Information

1. Remedial courses required by the English Department shall be taken for a grade.
2. Remedial computer programming courses shall be taken for a grade.
3. Special Topics coursework listed on the POS shall have the subject matter specified.
4. Tenure of appointment – for students on appointment satisfactory completion of one appointment (usually one year), plus satisfactory academic performance, will ordinarily make a student eligible for reappointment. Appointments are reviewed annually by the major professor. Students who do not make sufficient academic or research progress will be notified two months in advance of the decision to not reappoint them. The *Graduate College* rules state that after a period of three years of study for a Master’s degree or five years for the Doctorate, the student may be continued on assistantship support only with prior approval of the Graduate Dean.
5. Agricultural and Biosystems Engineering minors will take a closed-book, 3-hour written preliminary exam over subject matter taken from Agricultural and Biosystems Engineering courses included in the minor.

6. Courses that carry minor graduate credit (excepting those in the ABE Department) may be included on the POS only when the POS committee has determined that the material is substantially different from courses appearing on the student's undergraduate transcript.
7. A teaching/extension experience.

Concurrent BS/MS Program

Introduction

The concurrent Bachelor of Science/Master of Science (BS/MS) agricultural engineering/agricultural and biosystems engineering, biosystems engineering/agricultural and biosystems engineering, agricultural systems technology/industrial and agricultural technology, and industrial technology/industrial and agricultural technology degree programs in the Department of Agricultural and Biosystems Engineering are designed for those qualified students who have made a decision, before their last two semesters, to pursue a graduate degree with thesis. This program allows the student to take graduate courses in their field of study and to be eligible for a research assistantship during their senior year. With proper planning students may complete the M.S. degree within 18 months following their B.S. graduation.

Eligibility

To be eligible for application, a student seeking a BS/MS degree in either agricultural engineering or biosystems engineering must meet the following criteria.

1. Have a minimum GPA of 3.2/4.00.
2. Be within two semesters of graduation.
3. Be able to satisfy all graduation requirements for the B.S. with < 24 credit hours remaining on the program.

To be eligible for application, a student seeking a BS/MS degree in either agricultural systems technology or industrial technology must meet the following criteria.

1. Have a minimum GPA of 3.0/4.00. Have a minimum GPA of 3.2/4.0 in the two semesters prior to application.
2. Be within two semesters of graduation.
3. Be able to satisfy all graduation requirements for the B.S. with < 24 credit hours remaining on the program.

Application Process

Students interested in the concurrent program should identify their graduate specialization area of interest before the end of their junior year. We recommend that student contact the Chair of Graduate Programs Committee or a faculty member in the Department to discuss the concurrent program details and arrange for faculty interviews on various research topics being conducted by the faculty. The student will need to select a major professor from among those on graduate faculty and begin the admission process. A student should take at least two 500 level courses during the senior year that count toward the M.S. (but not the B.S.) degree. We will not accept a concurrent applicant as a restricted admission.

Admission

Admission criteria are similar to those used for all graduate students in the Department. Qualifying students must complete the "Concurrent Enrollment Request Form" available on-line at http://www.grad-college.iastate.edu/forms/forms.html. Applications for admission to the program will be reviewed by the department's graduate program committee. A Program of Study (POS) committee must be established no later than the second semester following admission.

Tuition Fees

A student accepted into the concurrent BS/MS program and qualified for a research assistantship (RA) appointment would pay in-state graduate tuition fees. RA appointments allow reduction in those fees as per *Graduate College* rules of the graduate tuition.

Graduate Coursework

In order to qualify for a Master of Science degree, the graduate work must be accomplished in accordance with the guidelines established in the current issue of the Agricultural and Biosystems Engineering Department "Graduate Student Guide". The concurrent BS/MS program allows students to take graduate courses for graduate credits as a senior.

Specialty Areas

Within the major the student will have the opportunity to work in the following specialty areas: water and environment, power and machinery, food and processing, structures and environment, and biosystems.

Research Assistantship

Students will be eligible to receive a quarter or half-time research assistantship in their senior year. It is anticipated that they will complete the program in 18 months or less after accumulating the credits normally required for the B.S. degree. If supported by a half-time research assistantship, a student may take up to 12 credit hours of course work and research each semester and up to 7 credit hours in the summer session and must work towards a M.S. degree with Thesis.

Conducting a Research Project

Research Proposal

The Research Proposal is the initial and most critical part of every research project, and every graduate student must prepare one (non-thesis M.S. students must prepare an abbreviated proposal of their capstone project). The proposal will provide a justification of specific objectives and define a procedure for achieving each objective.

Graduate students should prepare a draft proposal based on their review of relevant literature, original thought, and discussion with the major professor and committee members. The draft proposal should be submitted to the major professor, and the proposal should be refined to the joint satisfaction of the major professor and graduate student. After this is done, copies should be distributed to the POS committee.

For Ph.D. students and M.S. students (thesis option), the POS committee will meet to discuss the merits of the proposed project and decide if it is appropriate for the stated educational objectives.

Writing the Thesis or Dissertation

There are as many ways of writing a thesis or dissertation as there are combinations and permutations of faculty members and students. Keep the following points in mind: (1) Well written proposals generally lead to well written theses and dissertations – spend appropriate effort on the proposal to avoid wasted effort during the write up. (2) Memory fails – keep meticulous notes on the materials and methods employed, the experimental conditions, and the results. (3) Accidents happen – periodically back up all relevant notes (electronic and paper) and store the backup copies in a physically separate location from the originals. (4) Clear technical writing is the result of hard labor by the author – develop good writing skills through written class assignments, so that those skills are available when the thesis or dissertation is being prepared. In this vein, the words of E. B. White (The Elements of Style, 4th Ed., Longman Publishers, 2000) are relevant:

"Design informs even the simplest structure, whether of brick and steel or of prose. You

raise a pup tent from one sort of vision, a cathedral from another. This does not mean that you must sit with a blueprint always in front of you, merely that you had best anticipate what you are getting into. To compose a laundry list, you can work directly from the pile of soiled garments, ticking them off one by one. But to write a biography [or thesis or dissertation], you will need at least a rough scheme; you cannot plunge in blindly and start ticking off fact after fact about your subject, lest you miss the forest for the trees and there be no end to your labors"

Thesis/Dissertation Distribution

Final approved copies are submitted electronically to the *Graduate College*. One bound hard copy is required by the department. It is up to each major professor to determine whether they would like a bound hard copy or an electronic version. The cost for these two copies is paid by the department. If a student would like their own bound copy, a standing order is in place with ISU Printing Services. The cost for this will be charged back to the major professor. The departmental graduate secretary will send instructions for this process to the graduating group of students each semester.

Publication of Work in Peer-Reviewed Journals

Responsibility

Thesis-option M.S. students are expected to prepare and submit a manuscript of their research results for publication in a refereed professional journal. Doctoral students are expected to prepare and submit at least two manuscripts of their research results for publication in refereed professional journals. The graduate student shall obtain assistance from the major professor in planning, reviewing, revising, and submitting the manuscripts. (In cases where students do not submit manuscripts within 6 months of graduation, the major professor may choose to write a manuscript for publication based on the thesis or dissertation, and chose to list him/herself as 1st author on the manuscript.) To facilitate publication of graduate student research, at the POS committee's discretion, the thesis or dissertation may follow the alternative (journal article) format as outlined in the thesis handbook. If this format is chosen, the normal expectation for ABE students is two manuscripts for a thesis or three for a dissertation.

Assignment of Author

Normally, a graduate student who prepares a publication resulting from his/her thesis research will have senior authorship with the major professor listed as second author. However, first authorship should lie with the individual who made the greatest intellectual contribution to a particular manuscript. Thus, in cases where the graduate student has played a lesser role in the development of the research questions, or in intellectual development of the manuscript as a whole, the major professor may justifiably be listed as first author. As stated earlier, if the graduate student does not take the primary initiative in writing or revising a manuscript within 6 months of leaving the University, the major professor may publish results from the student's project and be listed as the senior author, even if the previously stated criteria are not met. When publishing thesis or dissertation research, it is suggested that any persons meeting the following criteria be considered for authorship:

All authors must have:

1. Given final approval of the submitted manuscript.
2. Participated sufficiently in the work to take public responsibility for part or all of the content.
3. Made substantial contributions to the intellectual content of the paper, as follows:
   At least one of the following three:
   a. Conception and design
   b. Acquisition of data
   c. Analysis and interpretation of data

AND

At least one of the following two:
a. Drafting of the manuscript
b. Critical revision of the manuscript for important intellectual content

Technical Communications for Graduate Students, ABE/TSM 598 and 698

Prompt publication of thesis research in a refereed journal and/or a patent application is the objective of research projects in the ABE Department. A refereed journal is a periodical, which solicits original (not previously published) research papers, sends them out for peer review, and, if recommended by the peer reviewers, publishes the paper (likely after some revision) in the journal. Publication in a refereed journal gives others maximum accessibility to your research results. Refereed publication and patents are likely to be one of the criteria by which students are judged as they seek employment. Responsibility for publication rests with the graduate student and major professor. The graduate student should generally be listed as the first author.

Sharing research results with peers also involves presentations at professional meetings. These presentations may be either an oral presentation or a poster presentation.

Since experience in the procedures of presenting and publishing research results is an important part of graduate education, all MS (with thesis) and PhD students in the ABE Department are required to complete one credit of ABE/TSM 598 (MS) or ABE/TSM 698 (PhD) for each degree completed at Iowa State University. During the last semester of their program, students should register for one credit of ABE/TSM 598 or 698, as appropriate. This course will be graded on a Satisfactory/Fail (S-F) basis. To complete requirements for the course, a student must: 1) make at least one technical presentation (oral or poster) based on thesis/dissertation research at a professional society meeting or at any international, regional, state, or university conference/event as long as the presentation content and form conforms to normal expectations; and 2) prepare at least one technical paper based on thesis/dissertation research, ready for submission to a refereed journal (as determined in consultation with the student's major professor). A satisfactory (S) grade will be assigned when the major professor submits a memo to the ABE DOGE that the requirements have been fulfilled. Credit in ABE/TSM 598 and/or ABE/TSM 698 is required of all MS and PhD students.

Major revisions to the manuscript following peer review will be the responsibility of the graduate student, if he or she wishes to retain first-author status. Otherwise the major professor or one of the other authors may assume first-author status and proceed with the publication. The graduate student will be listed among the authors in a place deemed appropriate by the major professor.

Registration

Registration for course work each term is the responsibility of the student. Course registration should conform to the student's program of study, and the minimum and maximum hours of registration as stated in the Graduate Catalog; particular attention should be paid by PhD students to the requirements for continuous registration. Course selection for each term should be in close consultation with the major professor.

Dropping Courses

The Graduate College has formal policies on withdrawing from courses (see the Graduate Catalog). The ABE department has no formal withdrawal or drop policy, except that all requests for withdrawing from a course shall be approved by the major professor.

Research Data, Software, and Designs

All research data, patents, software, designs, manuscripts, creations, etc. obtained and/or created by graduate students on University financial support are property of the State of Iowa. All research data and

other requested research findings must be submitted on a CD to the major professor before the student leaves the University. If any patents or publications are obtained directly from the student's thesis, both the student and major contributing advisor(s) are credited and may receive a percentage of the profits or royalties realized. The Iowa State University Research Foundation, Inc. Office of Intellectual Property & Technology Transfer establishes policies governing patents.

Use of Facilities and Resources

Facilities and resources under the stewardship of the ABE Department are for support of the Department's teaching, extension and research missions. Some departmental facilities and resources are, therefore, generally not placed at the disposal of any individual. The department head and/or faculty members establish policies governing facilities and resources.

Photocopying

Graduate student use of department photocopiers for coursework, term papers, thesis preparation, or personal use is expressly prohibited. If approved by the student's major professor, the photocopier may be used only for direct support of departmental work-related assignments, or for professional meeting presentations. Permission of the major professor is required before copying is done.

Computers

The Department makes computers available to graduate students as necessary to support their research program. However, the Department does not provide a computer for each student, and sharing of computers is normally necessary. Specific computer requirements related to research activities should be discussed with the faculty member directing that research. Depending upon needs and resources available, computers may sometimes be provided specifically for support of a particular program. Because these needs and resources may differ among research projects within the Department, all students may not have equal access to computers.

Some research activities may require storage of large data files. Students needing access to such file storage should contact their major professor. Personal data storage is available to each student as part of the engineering computer network.

Department computer laboratories are available to undergraduate and graduate students for work related to their academic programs. Demand for this resource sometimes exceeds availability. Departmental laboratories are available for e-mail, access to the Internet, course work (including printing of assignments, laboratory reports, etc), and other academic activities. They may also be used, on an "as available basis" for research related activities. However, they should not be used to print theses, manuscripts, and similar documents.

Theses, research-based manuscripts, and similar documents may be printed on ABE departmental printers, but only after confirming with the major professor that printing the particular document is approved. Commonly acceptable uses of departmental printers are listed below:

1. Preliminary copies of a thesis or dissertation, such as would be distributed to a committee
2. One final copy of a thesis or dissertation, to be copied later at the students own expense
3. Preliminary copies of a research-based manuscript, for distribution to co-authors
4. Final" copies of a research-based manuscript for distribution to internal reviewers
5. Final copies of research-based manuscript for submission to a peer-reviewed scientific journal

Students are encouraged to use electronic media, where appropriate, to communicate with their committee and with external peers. For example, in many cases, it is possible to circulate manuscripts in pdf format.

The major professor or department head may withdraw access to departmental printers, if the privilege is abused. Abuse includes printing of non-research-related documents, or irresponsible printer use, such as reprinting entire large manuscripts when only a few pages needed revision.

All graduate students must abide by the Iowa State University Information Technology Code of Computer Ethics and Acceptable Use, available at http://www.it.iastate.edu/policies/. Failure to abide by these guidelines is grounds for loss of assistantship and/or dismissal from the graduate program.

Office and Desk Assignments

The Department assigns available office and desk space to graduate students. Major professors will work with the graduate secretary and the chair of the departmental Space Committee to make those assignments. Priority of office space is generally given in the following order: 1) full-time Ph.D. students, 2) full-time master's students, and 3) part-time graduate students.

Office Clean-up Policy

Graduate students are responsible for cleaning their own office space when graduating. Once the graduate secretary has received verification from an authorized person in the corresponding building the clean-up is complete, the key return form will be initiated. The student can pick up that form from the graduate secretary in order to return any keys checked out in their name.

Office Supplies

Graduate student use of the Departmental office supplies for course work, or personal use is prohibited. Office supplies required for direct support of departmental work-related assignments may be obtained from the student's major professor.

ABE Shops

ABE maintains multiple lab/shop facilities with robust design, fabrication, build, and test capabilities. These facilities are continuously updated and improved, so they are not listed per se in this document. The facilities are broadly available to properly trained graduate students who are working on departmentally sponsored research projects. Please contact the appropriate Teaching Lab Coordinator (who oversees the various facilities) to learn about specific training and scheduling requirements. The Teaching Lab Coordinators or their support staff may be available to assist with construction of research apparatus. For a large project, plans (including detailed drawings) and a work request must be prepared and submitted to and approved by the major professor prior to submission to the Teaching Lab Coordinator. For small projects, or short-term assistance, please consult directly with the Teaching Lab Coordinator.

Please Note: Prior to contacting the Teaching Lab Coordinator – and ideally as early in your graduate career as possible – complete a Hazard Inventory.
Form available at: http://www.ehs.iastate.edu/laboratory/forms. If you work in any laboratory or shop, you must also review the Laboratory Safety Manual available at:http://publications.ehs.iastate.edu/labsm/. Furthermore, you should take safety training as described in “Safety Training Curriculum for Lab Personnel,” and any additional training pertinent to your activities.http://www.ehs.iastate.edu/laboratory/forms.

Research Space

The department head determines laboratory space assignments. Graduate students should request research or laboratory space though the major professor.

Keys

Once a graduate student is assigned office space, they will initiate the key request for their building from the graduate secretary. In like manner, if a student is required to have lab keys, the major professor will initiate the key request through the graduate secretary. Students are responsible for picking up keys at 108 General Services Building after orders have been processed and will need to take the request form with them. Keys must be returned prior to graduation and a form is required for that process as well. This is addressed under "Office Clean-up Policy."

Parking

All personal vehicles on campus must be registered with the University Parking Division.

Purchases

Permission, as well as an account number, must be obtained from the major professor before any purchases for a project are made with University funds. There are four ways to purchase an item for a project: 1) Purchasing card; 2) Purchase order; 3) Intramural; and 4) Personal purchase. All receipts should be given to the Departmental Account Clerk for accounting purposes. Please see the following website for more information http://www.public.iastate.edu/~purchasing/.

Mail Service

Mailboxes are provided for all graduate students, staff, and faculty members. Students should check their mailbox regularly. Much University and departmental communication is done through e-mail. It is the student's responsibility to obtain an ISU NET-ID e-mail account upon arrival at ISU. This can be done by going to https://asw.iastate.edu/cgi-bin/acropolis/register and following the instructions there.

University Vehicles

The University maintains a motor pool for official local, in-state, or out-of-state travel. The Department also has several vehicles for local and in-state travel. Vehicles from either source may be reserved on an "as available" basis, but the major professor must approve all use of university vehicles. Furthermore, use of university vehicles is a privilege afforded graduate students who (1) possess a valid driver's license, and (2) are employed by the University. It is expected that the driver will observe all traffic rules and regulations. Fines and penalties resulting from violation of traffic rules will be at the offender's expense and will precipitate a strong reprimand, which may include suspension of driving privileges. Graduate students must demonstrate the ability to handle certain vehicles to the major professor before being allowed to operate those vehicles.

All students who may be allowed to drive university-owned vehicles are subject to a review of their past driving history before being allowed to drive. This is accomplished by completing a driving permission request form for departmental requests (http://www.transportation.iastate.edu/DrivingHistory.doc) It is the responsibility of the department to maintain information on whether or not individual students are allowed to drive university-owned vehicles.

1. A student driver is required to have a valid and current operator's license. A student will not be allowed to drive a university-owned vehicle if the driving history record shows any of the following:
2. Two citations for a moving violation within the last 12 months.
3. Two accidents within the last 12 months where the student driver was at fault or contributory.
4. One accident where the student driver was at fault or contributory and one moving violation within the last 12 months.

5. One accident where the student driver was at fault or contributory or one moving violation in combination with a cautionary notification letter from the Department of Transportation in the last 12 months.
6. One citation for blood alcohol content within the last 12 months. Cases not yet resolved in the courts will be considered grounds for temporarily denying permission to drive a University vehicle.

The State Board of Claims will not receive or consider claims for injuries sustained in state-owned vehicles by unauthorized passengers or drivers, or during unauthorized vehicle use. Student employees who drive state-owned vehicles and are concerned with their personal risk exposure in this area are advised to contact their insurance agent regarding the procedures for including the desired non-owned automobile liability coverage in their existing private automobile insurance.

Travel Authorization

The driver and all passengers traveling out of Story County, IA, in a University-owned vehicle must have approved travel authorization granted by the department head. If a travel request is submitted through the departmental office and is placed on the central calendar, blanket authorization exists for in-state travel. Out-of-state travel must be requested ten business days in advance of the departure date. Anyone traveling on University-related business in a private vehicle must also have approved travel authorization from the department head. The travel authorization must be entered by the traveler electronically in Access Plus. Students should check with the major professor or with the office supervisor for details.

When travel is for the benefit of the university, travel expenses may be reimbursed subject to the availability of funds.

1. Expenses for out-of-state travel can only be paid if a travel request has been approved by the Major Professor, Department Head, and other university officials. This request should be submitted AT LEAST 15 DAYS before the departure, unless there are extenuating circumstances. Reimbursement must be initiated by the traveler in the AccessPlus Reimbursement menu and receipts for everything uploaded (see office procedure guide for cost limits on meals). When a personal car is used, a record of miles traveled must be included. The student should ask his or her major professor for details when traveling for the first time.

2. A travel request is not needed for in-state travel. The student should first check with his or her major professor, however.

3. If a University car is to be used, it must not be used for personal purposes. There are several penalties for infraction of this State of Iowa Law. In addition, careful attention must be paid to traffic regulations (e.g., speed limits). All drivers must have a valid Iowa Driver's License.

Accident and Incident Reporting

All accidents and incidents must be reported immediately in accordance with University policies and procedures. Failure to report an accident may result in loss of Workers Compensation benefits. Failure to report unsafe conditions may result in future injuries and/or property damage. To report an accident, incident, or unsafe condition, contact the work supervisor, major professor, department head or use the website: http://www.ehs.iastate.edu/cms/default.asp?action=article&ID=222. Refer to the Department of Environmental Health and Safety (http://www.ehs.iastate.edu/cms/default.asp) for more information.

Student Progress and Retention

Graduate Student Progress

Graduate students should make reasonable progress on their degree programs. Efficient use of funds and

time, as well as the student's stature in his/her profession, are sufficient reasons to give this attention. A student enrolled for an advanced degree should recognize that being a student and receiving a degree are not synonymous. The award of an advanced degree is contingent upon sound academic performance in coursework, demonstrating the ability to conduct independent research, and passing any preliminary and final exams.

Table 3 contains the progress expectations for MS and PhD students. If a special case is encountered, the major professor and the student must provide a written request with justification, three months in advance for extension of support. This request must be approved by the Department Chair and the department DOGE.

Table 3. Graduate Student Progress Guidelines

Degree	Event	Continuous Appointment % 50% or more	Less than 50%
MS	POS & Thesis completed	2 years from enrollment	3 years from enrollment
PhD	Preliminary exams	2 years after MS	3 years after MS
	POS & Dissertation completed	3 years after MS	4 years after MS

Reasonable Term of Study

The normal maximum time required to complete a full-time graduate program is two calendar years for master's students and three calendar years for doctoral students. Both the graduate student and the POS committee should strive to keep the reasonable term of study from being unduly exceeded.

Grounds for Dismissal and/or Grounds for Withdrawing Financial Support

Failure to meet deadline dates in a degree program sequence (as described in Table 2, page 13 of this handbook) may be grounds for dismissal from the graduate program. Furthermore, a student who has less than a 3.0 GPA after the first 9 graduate credit hours (or any subsequent semester) of graduate study will be placed on academic probation. If the student has not made satisfactory progress (as specified in the student's probationary agreement approved by the advisory committee) toward developing an overall 3.0 GPA by the end of the second semester following probation, the student will be dismissed from graduate study in the Department.

Failure to meet deadline dates in a degree program sequence (as described in Table 2) may be grounds for loss of financial support. Students on work-related assistantships may be evaluated in writing by their faculty work supervisor at the middle and end of each semester. The student may be notified in writing of their work performance, and may respond to this evaluation. The student may be placed on financial-support probation at the mid-point or end of any semester for poor work performance, poor academic performance, or excessive dropping of courses. If after 6 weeks, satisfactory work performance has not been achieved, financial support will be withdrawn.

The ABE Department follows university guidelines which can be found at http://www.gradcollege.iastate.edu/publications/gchandbook/chapter09.html.

Deviations from the university recommended policies must be approved in advance by the major professor, the student and the ABE DOGE.

Preliminary Examination Process in ABE

Oral Preliminary Exam

The Graduate College requires a preliminary oral examination of Ph.D. students. The Ph.D. preliminary oral examination rigorously tests a graduate student's knowledge of major, minor, and supporting subject areas as well as the student's ability to analyze, organize, and present subject matter relevant to their field.

Written Preliminary Exam

Prior to the oral preliminary exam, the ABE department requires a written preliminary examination of all Ph.D. students in Agricultural and Biosystems Engineering and all Ph.D. students in Industrial and Agricultural Technology. The format of the written examination is determined by the student's POS committee. The POS committee may select one of the two following options:

Exam Option

The written preliminary examination under this option shall include a minimum of three one-day, open-book exams that shall take place within a two-week period. Selection of questions and examiners shall be at the discretion of the POS committee. The student should be prepared to answer questions that involve synthesis of a solution from an incompletely posed problem. These exams should be regarded as a test of thinking skills rather than a test of rote memory.

Portfolio Option

The written preliminary examination under this option allows the student to reflect on their learning and provide evidence of their learning in six competency areas related to their research and career goals. Selection of competency areas shall be at the discretion of the POS committee. The first section of the portfolio will include a copy of the student's POS, vita, and long-term goals with a brief summary of how their POS ties in with those long-term goals. The goals and summary should be limited to approximately two pages. The second section will cover specific competencies. For each of the competency areas, the student will write a reflection (1-2 pages) on where they stand with respect to that particular competency; including a self-appraisal of their current level of understanding, coursework or life experiences that contributed to their current level of understanding, and what avenues need to be pursued in this area in the future to meet their commitment to life-long learning. The student will also include 2-3 examples (artifacts) of work that most clearly demonstrate their mastery of the competency area, along with a reflective explanation (maximum of 1 page per artifact) as to how, in their view, that artifact demonstrates the desired competency. The student portfolio is read and evaluated by the student's POS committee.

Regardless of the option selected for the written preliminary examination, the student will complete the written examination at least two weeks prior to the oral examination so that the POS committee has ample time review the written examination materials as they prepare for the oral examination.

Final Defense of Thesis/Dissertation

A candidate presenting a thesis or dissertation must pass a final oral examination on all work offered for the degree. The candidate may also be required to pass a written portion of the final examination at the discretion of the major professor, or the POS committee. The examination(s) is not merely a re-examination covering course material, but is a test of the candidate's ability to integrate material in the major and related fields, including work presented in the thesis or dissertation. This examination must be scheduled in accordance with deadlines specified by the Graduate College website. The completed thesis or dissertation, in a form approved by the major professor, shall be distributed to all POS committee members at least two weeks before the date of the final oral examination. The student's POS committee will conduct this final examination. Members of the University faculty may attend the examination. In case of failure of the final examination, the candidate may not appear for re-examination until the following semester. The result of the second examination is final.

Final Examinations for Non-Thesis MS Students

A non-thesis MS student must pass a final oral examination on all work offered for the degree and a presentation of the problem solved in lieu of a thesis. A report on the problem completed in lieu of a thesis must be made available to each committee member at least one week prior to the oral examination date. The oral examination must be scheduled through the *Graduate College* in accordance with the deadlines specified on the *Graduate College* website. The student's POS committee will conduct this final examination. Members of the University faculty may attend the examination. In case of failure of the final examination, the candidate may not appear for reexamination until the following semester. The result of the second examination is final.

Professional Performance Guidelines

Employment Policy
Holidays, Sick Days, and Vacations

The ABE Department follows university guidelines which can be found at http://www.gradcollege.iastate.edu/publications/gchandbook/chapter09.html.

Office Hours

All university employees and persons supported by departmental funds administered through the university should be aware that absence from campus during working hours is considered vacation. The term "working hours" is capable of flexible interpretation for a graduate student, but care should be taken to not abuse this policy.

Graduate students involved in departmental teaching programs (e.g., TAs) should maintain appropriate published hours to be accessible for students.

Participation in Departmental Research Projects

All degree recipients (thesis option) are required to submit a thesis or dissertation containing the results of original research. In addition to thesis or dissertation research, students are expected to participate in other research projects of their major professor, advisory committee members, and fellow graduate students, as approved by the major professor. Many of the routine and specialized methods and techniques used in research are not taught in classrooms. Exposure to, and participation in, as much of the overall departmental research program as possible is considered an essential part of graduate education. Thus, to receive the greatest benefit from their program, each graduate student should provide substantial assistance in other research projects, and should solicit collaboration in their own research.

Graduate Student Teaching Policy*

Each full-time Agricultural and Biosystems Engineering and IATec graduate student (paid on an ISU assistantship) is required to serve at least one semester as a graduate teaching assistant during their MS and PhD program. MS students are expected to do at a minimum one of the following: (1) course grading, (2) develop and teach a 2 week portion of a course (includes grading), (3) run a laboratory recitation section for a course, or (4) assist with the development and delivery of an extension program. PhD students are expected to do one of the following: (1) develop and teach a novel three week portion of a course and grade the course, (2) run a lab recitation section for a course and grade the course (3) deliver at least 50% of the lectures in a course closely mentored by a highly-rated instructor in ABE and grade the course, or (4) develop and deliver an extension program under the guidance of an ABE faculty member with a formal extension appointment and conduct a formal evaluation of the program. The assigned task and scheduling will be determined in collaboration and agreement with the major professor and the department associate chair. TAs will be provided first for core program required courses, then for other high demand course as TAs become available. Graduate credit can be obtained by taking ABE/TSM 694 for 1-3 credits at the same time as the teaching assignment if the teaching assignment is equivalent to at least 1 credit of instruction.

Industrial and Agricultural Technology Ph.D. Students

All Ph.D. students in the Industrial and Agricultural Technology program are required to have a significant teaching experience during their studies. This experience must incorporate all aspects of being the instructor of record for a university level class: curriculum development, curriculum delivery, and assessment of student of learning. The experience needs to be equivalent to at least one academic credit. The first time a student completes this experience, TSM 694 must be taken concurrently. The number of TSM 694 credits match the number of credits of the teaching experience. This experience will meet the requirements listed above for all departmental Ph.D. students.

*In effect for all ABE students starting with those admitted for Fall 2009.

Attendance at Professional Meetings

Graduate students are encouraged to attend at least one national professional meeting during their study program. They are strongly encouraged to present the results of their own research at these meetings.

In general, attendance at professional meetings will be at the student's expense. At times, staff members will be driving to the meetings, and in such cases, transportation for graduate students may be provided. At some professional meetings, reduced hotel rates and other amenities are available for graduate students. Students should consult their major professor for details.

Rights and Responsibilities

A graduate student at Iowa State University is a person who is officially admitted to and currently enrolled in the *Graduate College*.

The programs, policies, courses, procedures and minimum requirements of the *Graduate College* are described in the *Graduate Catalog*. Other information, including deadline dates for change of registration and submission of material to meet graduation requirements, is published on the *Graduate College* website. In addition, many departments and programs have brochures describing their own policies and procedures, which may be more restrictive than the general regulations of the *Graduate College*. It is the responsibility of each student to be thoroughly familiar with the regulations of the *Graduate College* and of the appropriate department or program, so as to avoid complications and delay. It is the responsibility of the *Graduate College* and the Department or program to keep the related information as current as possible. Changes in overall policies are processed through the Graduate Council.

University Mission

The Iowa State University mission is to create, share, and apply knowledge to make Iowa and the world a better place.

Professional and Academic Standards

Appeals

A graduate student at Iowa State University has the right to appeal any judgment or decision made within the University. The appeal procedure depends on the nature of the decision. The appeal procedure for disciplinary actions, for misconduct and professional, college, or university penalties associated with academic dishonesty (plagiarism, cheating, etc.) is outlined in chapter 9 of the *Graduate Handbook.* Questions regarding the appropriate appeal procedure should be addressed to The *Graduate College*.